ALLIANT TECHSYSTEMS

Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, VA 24141-0100

July 17, 1996 96-815-197

Debra Miller
Department of Environmental Quality
Office of Permitting Management, Hazardous Waste
629 East Main Street, Suite 406
Richmond, VA 23219

Subject: Response to VaDEQ letter Concerning PQL Revisions

Dear Ms. Miller:

This letter addresses the Virginia Department of Environmental Quality (VaDEQ) concerns about proposed PQL revisions for the RFAAP Equalization Basin Closure project expressed in DEQ's letter of 11 July 1996. The DEQ's comments are repeated here for convenience:

1. The information submitted from Radian states that "commercial laboratories review the results of the MDL study and, to facilitate data reporting requirements and to account for inter-instrument variability, will make the reporting limit the same for all the analytes in that method. For instance, the reporting limit of 5 ug/kg is utilized for all constituents of Method 8021A. However, based on review of the Table 1 methods and reporting limits, this does not hold true for all methods. For Methods 8440B, 8080A, and 6020, the reporting limits vary for the specific constituents. Please explain the inconsistent use of a uniform reporting limits for the various methods. Note, it is preferable to have and individual reporting limit for each constituent. Under Method 8012A, many of the detection limits listed are low enough that a reporting limit of 5 ug/kg is excessive. Additionally, in the previous amendment request, many of the Method 8012A constituents were approvable at a 1 ug/kg limit (i.e. benzene, chloroform, hexachlorobutadiene, methyl bromide, methyl chloride, methylene chloride, toluene, 1,2,4-trichlorobenzen, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroflorormethane, and vinyl chloride); however, this new submittal requests a further PQL increase to 5 ug/kg."

   To clarify RFAAP's use of some acronyms, our understanding of MDL, EQL, and PQL are listed below:

1. The Method Detection Limit (MDL) is referred to as the "detection limit" and is so used by RFAAP.

2. The Estimated Quantitation Limit (EQL) (known as the PQL in earlier editions of SW-846) commonly referred to as the "reporting limit", and is so used by RFAAP.

All reporting limits that were given in the letter of 23 May 1996 are the lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. Therefore, some of the reporting limits happen to be the same for all constituents in a certain Method while some of the reporting limits vary from constituent to constituent with in a Method.

The reporting limits that are given in Radian Corporation's letter of 16 May 1996 were discussed and agreed upon in the meeting of 21 May 1996 with Doug Brown (VaDEQ), Debra Miller(VaDEQ), Jerry Redder (RFAAP), Bob Richardson (RFAAP), and the Corps of Engineers. The reporting limits for Method 8021A constituents were 5 ug/kg in this letter. However, the reporting limits for Method 8021A were 1 ug/kg in the original closure plan. These limits are unachievable during routine laboratory operating conditions.

2. In accordance with Radian's response, the laboratories will include analytical results less than the reporting limit in their results. Please provide information regarding how/if this data will be qualified.

The data will be "J" flagged. All calibration, lab QA/QC, and surrogate recoverables will be sent with this data.

3. Please note that for Method 6020, selenium is not one of the constituents approved for the ICP-MS determination (see Table 1 of Method 6020). Therefore, in accordance with the scope and application of Method 6020, the analyst performing this method will need to demonstrate accuracy and precision of the Method (i.e Monitor interferences and take appropriate action to ensure data of know quality).

In the meeting of 21 May 1996 Method 6020 for selenium was accepted by VaDEQ per the letter from Radian 16 May 1996. To demonstrate accuracy and precision all calibration, lab QA/QC, and surrogate recoverables will be sent with this data.

4. For Acrolein, Radian proposed the use of 8240B as its detection limit is "lower than the 8030A detection limit". However, the previous amendment requested a

modification of the reporting limit to 15 ug/kg for Method 8030A, which is less than both Method 8240B's reporting and detection limits. Please provide further data/explanation supporting the conclusion that Method 8240B provides a lower detection limit. Note, based on available information, this conclusion is not supported.

In the meeting of 21 May 1996 Method 8030A for acrolein was accepted by VaDEQ per the letter form Radian 16 May 1996. In this letter the detection limit for Method 8030A was 25 ug/kg and the reporting limit was 100 ug/kg. Therefore, Method 8240B would provide lower detection limit (21 ug/kg) and the same reporting limit (100 ug/kg). Method 8240B was proposed to consolidated Methods so that Method 8030A would not be run for one constituent. In the original 7 March 1996 letter the reporting limit for Method 8030A for Acrolein was listed as 15 ug/kg this could have been an error.

Hopefully all of your questions regarding the proposed changes to Equalization Basin Closure have been answered. An amendment to the Closure Plan Section 3.5 Table 3-1 Hazardous Constituents of Concern is enclosed. We look forward to your approval of this amendment to the Equalization Basin Closure plan and commencing background sampling on 5 August 1996.

If you have any questions please contact, Jerry Redder at (540) 639-7536 or Arne Olsen (540) 639-8220, of my staff.

Very truly yours,

C. A. Jake
Environmental Manager

Enclosure

AEOlsen:V:\815-197

Coordination: R. L. Richardson

bc: Administrative File (w/o encl)
R. L. Richardson (w/o encl)
C. A. Jake (w/o encl)
Steve Lantz Norfolk Corps of Engineers (w/encl)
William Hearn Radian Corp. (w/o encl)
Lisa Ellis DEQ (w/o encl)
Glenn Von Gonten DEQ (w/o encl)
Doug Brown DEQ (w/o encl)
Khoa Nguyen (w/encl)
Env. file (w/encl)

Table 1

Analytical Limits for the RAAP Bioplant Equalization Basin Closure

Analyte	Required PQL (µg/kg)	Detection Limit (µg/kg)	Reporting Limit (µg/kg)
VOLATILES			
METHOD 8021A			
Benzene	0.09	0.37	5
Carbon Tetrachloride	0.03	0.94	5
Chlorobenzene	0.01	0.38	5
Chloroform	0.02	1.1	5
trans-1,2-Dichloroethene	0.02	0.93	5
Hexachlorobutadiene	0.20	1.8	5
Methyl Bromide	0.30	1.7	5
Methyl Chloride	0.10	0.94	5
Methylene Chloride	0.20	1.4	5
Naphthalene	0.60	3.4	5
Tetrachloroethene	0.01	0.21	5
Toluene	0.10	0.34	5
1,2,4-Trichlorobenzene	0.20	1.5	5
1,1,1-Trichloroethane	0.01	1.3	5
1,1,2-Trichloroethane	0.07	0.59	5
Trichloroethene	0.01	0.52	5
Trichlorofluoromethane	0.30	0.50	5
Vinyl Chloride	0.06	0.94	5
METHOD 8240B			
Acrolein	7	21	100
Carbon Disulfide	100	0.98	20
Methyl Ethyl Ketone	100	6.1	100

Table 1 (Continued)

Analytical Limits for the RAAP Bioplant Equalization Basin Closure

Analyte	Required PQL (µg/kg)	Detection Limit (µg/kg)	Reporting Limit (µg/kg)
SEMIVOLATILES			
METHOD 8070			
N-Nitrosodimethylamine	1.5	12	67
METHOD 8090			
2,4-Dinitrotoluene (FID/ECD)	13	82/0.56	330/10
2,6-Dinitrotoluene (FID/ECD)	7	82/0.65	330/10
METHOD 8110			
Bis(2-chloroethoxy) methane	5	16	30
Bis(2-chloroethyl) ether	3	9.9	30
Bis(2-chloroisopropyl) ether	8	24	30
METHOD 8121			
Hexachlorobenzene	3.8	0.12	3.3
Hexachlorocyclopentadiene	160	0.82	3.3
Hexachloroethane	1.1	0.11	3.3
METHOD 8151			
Pentachlorophenol	1.6	4.3	17
METHOD 8270B			
Bis(2-ethylhexyl) phthalate	180	27	330
Butyl benzyl phthalate	28	26	330
4-Chloro-3-methyl phenol	240	42	330
2-Chlorophenol	210	38	330
Di-n-butyl phthalate	220	27	330
Diethyl phthalate	170	21	330
2,4-Dimethylphenol	210	35	330
Dimethyl phthalate	190	24	330
4,6-Dinitro-2-methylphenol	3,300	27	330
Di-n-octyl phthalate	33	16	330
Phenol	94	38	330
2,4,5-Trichlorophenol	600	34	330
2,4,6-Trichlorophenol	390	33	330

Table 1 (Continued)

Analytical Limits for the RAAP Bioplant Equalization Basin Closure

Analyte	Required PQL (µg/kg)	Detection Limit (µg/kg)	Reporting Limit (µg/kg)
METHOD 8310			
Fluoranthene	140	0.27	10
Fluorene	140	1.0	10
METHOD 8330			
Nitrobenzene	260	12	250
PESTICIDES/PCBs			
METHOD 8080A			
Aldrin	3	0.58	1.7
Chlordane	9.4	3.5	17
Dieldrin	1.3	0.35	3.3
Endosulfan I	9.4	0.43	1.7
Endosulfan II	3	2.8	3.3
Endrin	4	0.30	3.3
Heptachlor	2	0.80	1.7
Heptachlor Epoxide	21	0.47	1.7
Methoxychlor	120	3.6	17
PCB 1016	2,500	4.6	33
PCB 1221	2,500	8.8	67
PCB 1232	2,500	13	33
PCB 1242	2,500	15	33
PCB 1248	2,500	5.0	33
PCB 1254	2,500	5.2	33
PCB 1260	2,500	13	33
Toxaphene	57	34	170
METALS			
METHOD 6020			
Arsenic	10	0.85 µg/L*	200
Barium	20	0.16 µg/L*	100
Beryllium	3	0.15 µg/L*	100
Cadmium	1	0.17 µg/L*	200
Chromium	10	0.34 µg/L*	100

Table 1 (Continued)

Analytical Limits for the RAAP Bioplant Equalization Basin Closure

Analyte	Required PQL (µg/kg)	Detection Limit (µg/kg)	Reporting Limit (µg/kg)
Lead	10	0.36 µg/L[a]	100
Nickel	0.2	0.67 µg/L[a]	100
Selenium	20	0.51 µg/L[a]	200
Silver	2	0.52 µg/L[a]	100
Thallium	10	0.08 µg/L[a]	100
METHOD 7471A			
Mercury	2	0.03 µg/L[a]	100
METHOD 9010A			
Cyanide	20	8 µg/L[a]	100

[a]These detection limits are based on a MDL study of an aqueous matrix.

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

George Allen
Governor

Becky Norton Dunlop
Secretary of Natural Resources

Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 10009, Richmond, Virginia 23240
Fax (804) 698-4500 TDD (804) 698-4021
http://www.deq.state.va.us

Thomas L. Hopkins
Director

(804) 698-4000
1-800-592-5482

July 11, 1996

Ms. C.A. Jake
Alliant Techsystems Inc.
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

RE: Radford Army Ammunition Plant (RAAP), EPA ID# VA12100207306
Equalization Basin Closure Amendment
SW-846 Methods' PQL Revisions

Dear Ms. Jake:

On March 27, 1996, RAAP submitted an amendment for the Equalization Basin's approved closure plan to the Department of Environmental Quality (DEQ). This amendment requested a revision of the practical quantitation limits (PQL) for the approved SW-846 test methods. DEQ responded to this amendment request on April 23, 1996, and DEQ staff met with RAAP, Alliant, and Radian personnel on May 21, 1996, to discuss the amendment issues. In accordance with the DEQ response and meeting discussions, RAAP submitted additional information in support of this amendment request on May 30, 1996.

Based on the information submitted, the following comments must be addressed: (Note, all Test Methods listed are SW-846, Third Addition, as updated)

1. The information submitted from Radian states that "commercial laboratories review the results of the MDL study and, to facilitate data reporting requirements and to account for inter-instrument variability, will make the reporting limit the same for all the analytes in that method." For instance, the reporting limit of 5 μg/kg is utilized for all constituents of Method 8021A. However, based on review of the Table 1 methods and reporting limits, this does not hold true for all methods. For Methods 8240B, 8080A, and 6020, the reporting limits vary for the specific constituents. Please explain the inconsistent use of a uniform reporting limits for the various methods. Note, it is preferable to have an individual reporting limit for each constituent. Under Method 8021A, many of the detection limits listed are low enough that a reporting limit of 5 μg/kg is excessive. Additionally, in

the previous amendment request, many of the Method 8021A constituents were approvable at a 1 μg/kg limit (i.e. benzene, chloroform, hexachlorobutadiene, methyl bromide, methyl chloride, methylene chloride, toluene, 1,2,4-trichlorobenzene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichlorofluoromethane, and vinyl chloride); however, this new submittal requests a further PQL increase to 5 μg/kg.

2. In accordance with Radian's response, the laboratories will include analytical results less than the reporting limit in their results. Please provide information regarding how/if this data will be qualified.

3. Please note that for Method 6020, selenium is not one of the constituents approved for the ICP-MS determination (see Table 1 of Method 6020). Therefore, in accordance with the scope and application of Method 6020, the analyst performing this method will need to demonstrate accuracy and precision of the Method (i.e. monitor interferences and take appropriate action to ensure data of known quality).

4. For Acrolein, Radian proposed the use of 8240B as its detection limit is "lower than the 8030A detection limit". However, the previous amendment requested a modification of the reporting limit to 15 ug/kg for Method 8030A, which is less than both Method 8240B's reporting and detection limits. Please provide further data/explanation supporting the conclusion that Method 8240B provides a lower detection limit. Note, based on available information, this conclusion is not supported.

Based on review of the information submitted, this closure plan amendment will require the submittal of above noted information. RAAP is requested to submit this information in support of their closure plan amendment. If there are any questions regarding the information provided, please contact me at (804) 698-4206.

Sincerely,

(6-18-96)

for Debra A. Miller
Environmental Engineer Senior

cc: Lisa Ellis, DEQ
Glenn VonGonten, DEQ
Doug Brown, DEQ
Mike Scott, DEQ-RRO

Track ID#PM96-0086

ALLIANT TECHSYSTEMS

Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, VA 24141-0100

96-815-158

May 28, 1996

Debra A. Miller
Environmental Engineer Senior
Department of Environmental Quality
Office of Permitting Management, Hazardous Waste
629 East Main Street, Suite 406
Richmond, VA 23219

Subject: PQL Revisions, Table 3-1
Closure Plan for Equalization Basin HWMU 10 & SWMU 10
Radford Army Ammunition Plant, Radford Virginia, EPA ID# VA12100207306

Dear Ms. Miller:

I appreciate your meeting with Jerry Redder, Bob Richardson, and the Corps of Engineers, Tuesday May 21, 1996. According to Mr. Redder the meeting went very well. Based on the outcome of that meeting the Corps of Engineers' contractor, Radian, is proposing an alternate set of reporting limits and detection limits. These limits would be in lieu of the limits listed in Table 3-1 for soil.

Enclosed is the letter from Radian to the Corps of Engineers; an advance copy was faxed to you on May 23, 1996. Please review the information and let Mr. Redder know if the limits are acceptable. He will then proceed with requesting a closure plan amendment based on your review and comments. In order to avoid multiple amendments we propose to wait until this matter is resolved prior to amending the closure plan for the previously approved extension request.

If you have any questions or concerns please contact Jerry Redder (540) 639 7536.

Sincerely

C. A. Jake

C. A. Jake
Environmental Manager

Enclosures

c: Doug Brown, DEQ
Mike Scott, DEQ-RRO
R. L. Richardson, RAAP ACO
S. M. Lantz, Norfolk Corps of Engineers
W. R. Hearn, Radian Corporation

Coordination: R. L. Richardson
R. L. Richardson

bc: Administrative File
C. A. Jake
J. J. Redder
M. H. Bolt
Env. File

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RADIAN
CORPORATION

2455 Horsepen Road, Suite 250
Herndon, VA 22071
(703)713-1500

23 May 1996

Steven M. Lantz, P.E.
Civil Engineer
GeoEnvironmental Branch
Norfolk District, Corps of Engineers
803 Front Street
Norfolk, Virginia 23510-1096

Subject: Response to VaDEQ Letter Concerning PQL Revisions
Delivery Order 10, Contract DACA65-95-D-0030

Dear Mr. Lantz:

This letter addresses the Virginia Department of Environmental Quality (VaDEQ) concerns about proposed PQL revisions for the RAAP Equalization Basin Closure project. Radian has responded to these concerns in this letter as well as in a meeting with VaDEQ on 21 May 1996.

Radian undertook a laboratory selection process of contacting seven Missouri River District (MRD) certified labs. We selected two labs based on their ability to provide the lowest PQLs. For several of the hazardous constituents of concern, the PQL required by the Closure Plan was not achieved. In general, the justification for a laboratory not achieving a PQL is related to variability between individual instruments in the laboratory, i.e., a commercial lab will utilize several instruments on a routine basis, and laboratory contamination. Also, we understand the SW-846 MDLs were determined in a research laboratory setting while the PQLs we are reporting are determined by commercial laboratories routinely processing large numbers of samples.

To ensure we are all using the same definition of some common terms, the following summary is presented. Chapter 1 of SW-846 defines the Method Detection Limit (MDL) as "the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from the analysis of a sample in a given matrix type containing the analyte." The MDL is commonly referred to as the "detection limit" and is so used by Radian. Chapter 1 of SW-846 also defines the Estimated Quantitation Limit (EQL) (known as the PQL in earlier editions of SW-846) as "the lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions." The EQL is commonly referred to as the "reporting limit", and is so used by Radian. SW-846 allows laboratories to choose their EQLs, within the guidelines in SW-846, to simplify data reporting requirements.

Based on information from the selected laboratories, the detection limits and the reporting limits for the required analytical methods are presented in the attached table. Except for the metals by Method 6020 and cyanide, the detection limits in this table are actual concentrations from the laboratory method detection limit studies performed on a soil matrix, and represent those concentrations a commercial laboratory can typically achieve as the detection limit under routine operating conditions. When establishing reporting limits for a given analytical method, commercial laboratories review the results of the MDL study and, to facilitate data reporting requirements and to account for inter-instrument variability, will make the reporting limit the same for all the analytes in that method. For example, the detection limits from the soil MDL study for the three analytes are 16 μg/kg, 9.9 μg/kg, and 24 μg/kg, and the laboratory established the reporting limit for all three analytes at 30 μg/kg, again to facilitate data reporting, etc. We recognize in several cases, the detection limits (and reporting limits) are greater than the Closure Plan-specified PQL; consequently, this letter provides reasons why the commercial laboratories we have selected cannot achieve the PQLs required by the Closure Plan. The laboratories have agreed to include analytical results less than the reporting limit in their data packages.

Radian prepared responses to each of the comments made by DEQ in their letter of 23 April 1996. The DEQ's comments are repeated here for convenience:

1. *Method 6020 should be the test method used for determination of arsenic, barium, beryllium, chromium, lead, silver, and thallium concentrations. The approved closure plan requires the use of the SW-846 test method with the lowest PQL for background closure. For these constituents, other test methods with higher PQLs were chosen and a request for revising these PQLs was submitted. Please note, the chosen test methods are not acceptable for background closure. Method 6020 shall be utilized for these constituents as it has the lowest PQL.*

   We will use Method 6020 for the analytical analysis of these elements. The following values are derived from a MDL study on an aqueous matrix conducted by the laboratory:

Element	Detection Limit (μg/L)	Reporting Limit (μg/kg)
Arsenic	0.85	200
Barium	0.16	100
Beryllium	0.15	100
Chromium	0.34	100
Lead	0.36	100
Silver	0.52	100
Thallium	0.08	100

We also propose to analyze cadmium and selenium by Method 6020 as the detection limits by this method are lower than the corresponding graphite furnace atomic absorption methods. The detection limits and reporting limits follow:

Element	Detection Limit (µg/L)	Reporting Limit (µg/kg)
Cadmium	0.17	200
Selenium	0.51	200

2. *The revised PQLs for the following constituents cannot be approved at this time. In accordance with SW-846, Chapter One, laboratories shall have procedures for demonstrating proficiency with each analytical method routinely used in the laboratory. These procedures shall include demonstration of precision and bias of the method, as performed in the laboratory, and shall provide for determination of the method detection limit (MDL). Please provide the latest MDLs for each of the below mentioned Methods. Prior to any decision regarding the increase in PQLs, additional justifying information for each of the following SW-846 test methods will also need to be submitted (i.e. sample preparation, reagents, spike recovery, matrix interference, etc...).*

   a. *Method 6020 for Nickel - requested PQL revision from .2 µg/kg to 2500 µg/kg. Please explain the need for an increase of 12500 times. Although acid digestion is needed prior to use of Method 6020 and may contribute to an increase in the achievable PQL, such a large increase, as the one requested, will necessitate the submittal of additional information for appropriate justification.*

      The revised reporting limit for nickel by Method 6020 is 100 µg/kg. Acid digestion, inter-instrument variability and ease of data reporting are the justifications for not meeting the requested PQL of 0.2 µg/kg.

   b. *Method 8061 for Butyl benzyl phthalate and Di-n-octyl phthalate - requested PQL revision from 28 to 500 µg/kg for Butyl Benzyl phthalate and from 33 to 500 µg/kg for Di-n-octyl phthalate. Both of these revised PQLs are greater than 15 times the recommended SW-846 Method 8061 PQL. Please provide specific justification to explain the increase in PQL for this test method.*

      The detection limits for Butyl benzyl phthalate and Di-n-octyl phthalate are 32 and 31 µg/kg, respectively. In our 16 May letter and during the

meeting, Radian proposed to use Method 8061 for these two compounds. Additionally, we proposed that dimethyl phthalate will also be analyzed by Method 8061 instead of Method 8060 as the reporting limits are the same (330 µg/kg). After reviewing additional information from the laboratory, we are proposing to use Method 8270B for the analysis of these phthalate compounds as the reporting limits by 8270B are the same as 8061 (330 µg/kg). A comparison of the detection limits determined from MDL studies on a soil matrix follows:

	Detection Limit (µg/kg)	
Analyte	8061	8270B
Bis(2-ethylhexyl) phthalate	29	27
Butyl benzyl phthalate	32	26
Di-n-butyl phthalate	28	27
Diethyl phthalate	31	21
Dimethyl phthalate	29	24
Di-n-octyl phthalate	31	16

c. *Method 8010B for Carbon Tetrachloride, Chlorobenzene, Chloroform, Trans-1,2-Dichloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, Trichloroethylene, Tetrachloroethylene, and Vinyl chloride - requested PQL revision from .01-.06 µg/kg (depending on constituent) to 1 µg/kg. This requested PQL modification is from 16 to 100 times greater than the Method 8010B specified PQL. Please explain with greater detail this increase. Note, if the laboratories cannot achieve the Method 8010B PQL, determine if a lower PQL can be achieved for Method 8021A. If a lower PQL for Method 8021A can be achieved, then that Method shall be utilized for those constituents.*

The detection limits derived from a MDL study for Methods 8010B and 8021A on a soil matrix are as follows:

	Detection Limit (µg/kg)	
Analyte	8010B	8021A
Carbon Tetrachloride	1.1	0.94
Chlorobenzene	1.1	0.38
Chloroform	0.99	1.1
trans-1,2-Dichloroethylene	1.7	0.93
Methyl Bromide	1.4	1.7
Methyl Chloride	0.85	0.94
Tetrachloroethene	0.47	0.21
1,1,1-Trichloroethane	1.1	1.3
1,1,2-Trichloroethane	0.95	0.59
Trichloroethylene	1.3	0.52
Vinyl Chloride	1.2	0.94

We propose to perform all of the above analytes by 8021A, including methyl bromide and methyl chloride. The reporting limits for all of the analytes by Method 8021A are 5 µg/kg.

Inter-instrument variability and lab contamination are the justifications for not meeting the requested PQLs of 0.01-0.06 µg/kg.

d. *Method 9010A for Cyanide - requested PQL revision from 20 µg/kg to 500 µg/kg. Additional information pertinent to this method shall be provided for justification.*

The detection limit for cyanide by Method 9010A is 8 µg/L as determined by an MDL study in an aqueous matrix. Sample preparation and inter-instrument variability are justifications for not meeting the required PQL of 20 µg/kg.

e. *Method 8090 for 2,4-Dinitrotoluene and 2,6-Dinitrotoluene - requested PQL revision from 13 to 330 µg/kg for 2,4-dinitrotoluene and from 7 to 330 µg/kg for 2,6-dinitrotoluene. Additional information to support the PQL revision request for this specific method must be submitted.*

The detection limit for 2,4-Dinitrotoluene and 2,6-Dinitrotoluene is 82 µg/kg for Method 8090 using a flame ionization detector. If an electron

capture detector is used, the detection limit for 2,4-Dinitrotoluene is 0.56 μg/kg and for 2,6-Dinitrotoluene is 0.65 μg/kg. Radian proposes to use the electron capture detector.

f. Method 7470 is not one of the approved methods for Mercury, as it does not provide the lowest PQL and has been recently updated. Either Method 7470A or 7471A shall be used for the analysis of mercury.

Method 7471A will be used for Mercury. The detection limit is 0.03 μg/L.

g. Method 8070 for N-nitrosodimethylamine - requested PQL revision from 1.5 to 330 μg/kg. As the requested PQL is 220 times the Method 8070 specified PQL, additional information for this specific test method and the cause for the increase in PQL must be submitted.

The detection limit for N-Nitrosodimethylamine by Method 8070 is 12 μg/kg. The reporting limit has been revised from 330 μg/kg to 67 μg/kg. Inter-instrument variability and lab contamination is the justification for not meeting the requested PQL of 1.5 μg/kg.

h. Method 7741A for Selenium - requested PQL revision from 20 to 250 μg/kg. Additional information shall be submitted to justify this PQL revision.

As stated in our response to Comment 1, we are proposing to perform the analysis for selenium by Method 6020.

For the above requested PQL revisions, it should also be determined if any of the other methods listed for the specific constituent would provide a lower PQL than the proposed PQL revision. If a lower PQL can be achieved with a different test method, it may be necessary to utilize that method.

3. *A PQL revision for Method 8061 for Di-n-butyl phthalate and Diethyl phthalate was also requested. This revision proposed to increase the PQL from 220 to 500 μg/kg for di-n-butyl phthalate and from 170 to 500 μg/kg for Diethyl phthalate. Although these PQL increases can be approved, it should be determined if Method 8060 will provide a lower PQL for the constituents. If a lower PQL can be achieved with Method 8060, then that method shall be utilized.*

The detection limit for Di-n-butyl phthalate is 28 μg/kg, and the detection limit for Diethyl phthalate is 31 μg/kg; the reporting limits have been revised to 330 μg/kg for both analytes. Method 8060 does <u>not</u> provide a lower PQL for these

analytes. We propose to perform the analysis for Dimethyl phthalate by Method 8061 rather than Method 8060 as both methods provide the same detection limit and reporting limit for this analyte. As described in our response to Comment 1b, we are proposing to use Method 8270B for the analysis of these phthalate compounds.

4. *RAAP proposed to increase the Method 8010B PQL for Methyl Chloride. This increase in PQL from .1 to 1 μg/kg can be approved; however, it should be determined if Method 8021A will provide a lower PQL. If a lower PQL can be achieved with Method 8021A, then that method shall be used.*

   The detection limit for methyl chloride Method 8010B is 0.85 μg/kg. The DL for methyl chloride by Method 8021A is 0.94 μg/kg. As stated in our response to Comment 2c, since both Methods 8010B and 8021A provide comparable MDLs and reporting limits, we propose to perform the analysis for Methyl Chloride by Method 8021A.

5. *For PCB analysis using Method 8250, RAAP proposed to increase the PQL increase from 2000 to 3500 μg/kg. This requested PQL revision can be approved; however, it should be determined if Method 8080A will provide a lower PQL. If a lower PQL can be achieved with Method 8080A, then that method shall be used.*

   We will use Method 8080A for the PCBs analysis as this method provides a lower detection limit than does Method 8250. See Table 1.

Additional Responses:

There are two instances where we are proposing to consolidate analytes into one analytical method. These instances are discussed below. In both of these cases, the same reporting limit as the original method will be used. These proposed changes are reflected in Table 1.

A. We are proposing to perform the analysis for acrolein by Method 8240 rather than 8030A. The reporting limit by 8240 is 100 μg/kg, with a detection limit of 21 μg/kg, which is lower than the 8030A detection limit.

B. We are proposing to perform the analysis for 4-chloro-3-methyl phenol, 2-chlorophenol, 2,4-dimethyl phenol, and phenol by Method 8270B instead of by Method 8040A. The reporting limits (330 µg/kg) by 8270B for these compounds are identical to 8040A. A comparison of the detection limits, determined from MDL studies on a soil matrix follows:

	Detection Limit (µg/kg)	
Analyte	8040B	8270B
4-Chloro-3-methyl phenol	41	42
2-Chlorophenol	50	38
2,4-Dimethyl phenol	148	35
Phenol	68	38

If you have any questions or would like additional information, please call Steve Falatko at 703/713-6408, or Bob Hearn at 703/713-6410.

Sincerely,

William R. Hearn for

Torsten Rothman, P.E., DEE
Project Manager

MLM/059
0510-01.mlm

ALLIANT TECHSYSTEMS

Fax Cover Sheet

Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

Date: 5/17	Time: 8:50	Pages to follow: 14	__ Urgent __ Confidential
To: **DEBRA MILLER**		Company: DEQ	
Address: 629 E. Main St Richmond, VA			
Telephone: 804-698-4206		Fax: 804-698-4234	
From: Jerry Redder		Telephone: (540) 639-7536	Fax: 540-639-7214
Note: If you did not receive a clear transmission, please call:			Telephone: 540-639-7536

Comments:

Thanks for the help yesterday. The following transmission is the letter that the Corps of Engineers' contractor sent to them. It is not a final this is the position, it is an opening dialogue to resolve the PQL and detection limits for the EQ Basin closure.

The last page is a proposed agenda. Basically we are proposing to start with what we think are the more easily resolved issues and work toward the more complicated. If you wish to have a different agenda that fine with us.

If you have any question about the letter or think we can resolve some of the comments prior to the Tuesday meeting please feel free to contact me.

At this time Bob Richardson, Radford Government staff
Steve Lantz, Program Manger for the Norfolk Corps of Engineers
Bob Hearn, Radian Corp.
Steve Falatko, Radian Corp.
And myself will be at the meeting.

I look forward to meeting you Tuesday May 21, 1996.

RADIAN INTERNATIONAL LLC

FAX COVER SHEET

16 May 1996 / 1126

TO: Jerry Redder

ORGANIZATION: Alliant Techsystems Inc

FAX NUMBER: 540-639-7214

FROM: Bob Hearn

Radian International LLC
2455 Horsepen Road, Suite 250
Herndon, Virginia 22071
(703) 713-6410
Fax No.: (703) 713-1512

12 Pages follow this cover sheet

FOR ASSISTANCE, PLEASE CALL (703) 713-1500

Comments:

Jerry, attached is the revised letter and a proposed agenda for the meeting on Tuesday. If you have a question, please call me today.

bob hearn

AGENDA

RADFORD ARMY AMMUNITION PLANT
EQUILIZATION BASIN CLOSURE
SW-846 METHODS' PQL REVISION

USE OF METHOD 8080A FOR PCB ANALYSIS

DETECTION LIMITS FOR METALS

USE OF METHODS 8060 AND 8061 FOR ANALYSIS OF PHTHALATES

DETECTION LIMIT FOR CYANIDE

USE OF METHOD 8090 FOR THE DINITROTOLUENES

USE OF METHOD 8070 FOR N-NITROSODIMETHYLAMINE

DETECTION LIMITS FOR VOLATILE ORGANICS

RADIAN
CORPORATION

16 May 1996

2455 Horsepen Road, Suite 250
Herndon, VA 22071
(703)713-1500

Steven M. Lantz, P.E.
Civil Engineer
GeoEnvironmental Branch
Norfolk District, Corps of Engineers
803 Front Street
Norfolk, Virginia 23510-1096

Subject: Response to VaDEQ Letter Concerning PQL Revisions
Delivery Order 10, Contract DACA65-95-D-0030

Dear Mr. Lantz:

This letter is in response to the Virginia Department of Environmental Quality (VaDEQ) letter, dated April 23, 1996, concerning the proposed PQL revisions for the RAAP Equalization Basin Closure project. Radian undertook a laboratory selection process of contacting seven Missouri River District (MRD) certified labs. We selected two labs based on their ability to provide the lowest PQLs. For several of the hazardous constituents of concern, the PQL required by the Closure Plan was not achieved. In general, the justification for a laboratory not achieving a PQL is related to variability between individual instruments in the laboratory, i.e., a commercial lab will utilize several instruments on a routine basis, and laboratory contamination. Also, we understand the SW-846 MDLs were determined in a research laboratory setting while the PQLs we are reporting are determined by commercial laboratories routinely processing large numbers of samples.

To ensure we are all using the same definition of some common terms, the following summary is presented. Chapter 1 of SW-846 defines the Method Detection Limit (MDL) as "the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from the analysis of a sample in a given matrix type containing the analyte." The MDL is commonly referred to as the "detection limit" and is so used by Radian. Chapter 1 of SW-846 also defines the Estimated Quantitation Limit (EQL) (known as the PQL in earlier editions of SW-846) as "the lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions." The EQL is commonly referred to as the "reporting limit", and is so used by Radian. SW-846 allows laboratories to choose their EQLs, within the guidelines in SW-846, to simplify data reporting requirements.

Based on information from the selected laboratories, the detection limits and the reporting limits for the required analytical methods are presented in the attached table. Except for the metals by Method 6020 and cyanide, the detection limits in this table are

actual concentrations from the laboratory method detection limit studies performed on a soil matrix, and represent those concentrations a commercial laboratory can typically achieve as the detection limit under routine operating conditions. When establishing reporting limits for a given analytical method, commercial laboratories review the results of the MDL study and, to facilitate data reporting requirements and to account for inter-instrument variability, will make the reporting limit the same for all the analytes in that method. For example, the detection limits from the soil MDL study for the three analytes are 16 μg/kg, 9.9 μg/kg, and 24 μg/kg, and the laboratory established the reporting limit for all three analytes at 30 μg/kg, again to facilitate data reporting, etc. We recognize in several cases, the detection limits (and reporting limits) are greater than the Closure Plan-specified PQL; consequently, this letter provides reasons why the commercial laboratories we have selected cannot achieve the PQLs required by the Closure Plan. The laboratories have agreed to include analytical results less than the reporting limit in their data packages.

Radian prepared responses to each of the comments made by DEQ in their letter of 23 April 1996. The DEQ's comments are repeated here for convenience:

1. *Method 6020 should be the test method used for determination of arsenic, barium, beryllium, chromium, lead, silver, and thallium concentrations. The approved closure plan requires the use of the SW-846 test method with the lowest PQL for background closure. For these constituents, other test methods with higher PQLs were chosen and a request for revising these PQLs was submitted. Please note, the chosen test methods are not acceptable for background closure. Method 6020 shall be utilized for these constituents as it has the lowest PQL.*

   We will use Method 6020 for the analytical analysis of these elements. The following values are derived from a MDL study on an aqueous matrix conducted by the laboratory:

Element	Detection Limit (μg/L)	Reporting Limit (μg/kg)
Arsenic	0.85	200
Barium	0.16	100
Beryllium	0.15	100
Chromium	0.34	100
Lead	0.36	100
Silver	0.52	100
Thallium	0.08	100

We also propose to analyze cadmium and selenium by Method 6020 as the detection limits by this method are lower than the corresponding graphite furnace atomic absorption methods. The detection limits and reporting limits follow:

Element	Detection Limit (µg/L)	Reporting Limit (µg/kg)
Cadmium	0.17	200
Selenium	0.51	200

2. *The revised PQLs for the following constituents cannot be approved at this time. In accordance with SW-846, Chapter One, laboratories shall have procedures for demonstrating proficiency with each analytical method routinely used in the laboratory. These procedures shall include demonstration of precision and bias of the method, as performed in the laboratory, and shall provide for determination of the method detection limit (MDL). Please provide the latest MDLs for each of the below mentioned Methods. Prior to any decision regarding the increase in PQLs, additional justifying information for each of the following SW-846 test methods will also need to be submitted (i.e. sample preparation, reagents, spike recovery, matrix interference, etc...).*

   a. *Method 6020 for Nickel - requested PQL revision from .2 µg/kg to 2500 µg/kg. Please explain the need for an increase of 12500 times. Although acid digestion is needed prior to use of Method 6020 and may contribute to an increase in the achievable PQL, such a large increase, as the one requested, will necessitate the submittal of additional information for appropriate justification.*

      The revised reporting limit for nickel by Method 6020 is 100 µg/kg. Acid digestion, inter-instrument variability and ease of data reporting are the justifications for not meeting the requested PQL of 0.2 µg/kg.

   b. *Method 8061 for Butyl benzyl phthalate and Di-n-octyl phthalate - requested PQL revision from 28 to 500 µg/kg for Butyl Benzyl phthalate and from 33 to 500 µg/kg for Di-n-octyl phthalate. Both of these revised PQLs are greater than 15 times the recommended SW-846 Method 8061 PQL. Please provide specific justification to explain the increase in PQL for this test method.*

      The detection limits for Butyl benzyl phthalate and Di-n-octyl phthalate are 32 and 31 µg/kg, respectively.

c. *Method 8010B for Carbon Tetrachloride, Chlorobenzene, Chloroform, Trans-1,2-Dichloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, Trichloroethylene, Tetrachloroethylene, and Vinyl chloride - requested PQL revision from .01-.06 µg/kg (depending on constituent) to 1 µg/kg. This requested PQL modification is from 16 to 100 times greater than the Method 8010B specified PQL. Please explain with greater detail this increase. Note, if the laboratories cannot achieve the Method 8010B PQL, determine if a lower PQL can be achieved for Method 8021A. If a lower PQL for Method 8021A can be achieved, then that Method shall be utilized for those constituents.*

The detection limits derived from a MDL study for Method 8010B on a soil matrix are as follows:

	Detection Limit (µg/kg)	
Analyte	8010B	8021A
Carbon Tetrachloride	1.1	0.94
Chlorobenzene	1.1	0.38
Chloroform	0.99	1.1
trans-1,2-Dichloroethylene	1.7	0.93
Methyl Bromide	1.4	1.7
Methyl Chloride	0.85	0.94
Tetrachloroethene	0.47	0.21
1,1,1-Trichloroethane	1.1	1.3
1,1,2-Trichloroethane	0.95	0.59
Trichloroethylene	1.3	0.52
Vinyl Chloride	1.2	0.94

We propose to perform all of the above analytes by 8021A, including methyl bromide and methyl chloride. The reporting limits for all of the analytes by Method 8021A are 5 µg/kg.

Inter-instrument variability and lab contamination are the justifications for not meeting the requested PQLs of 0.01-0.06 µg/kg.

d. *Method 9010A for Cyanide - requested PQL revision from 20 µg/kg to 500 µg/kg. Additional information pertinent to this method shall be provided for justification.*

The detection limit for cyanide by Method 9010A is 8 µg/L as determined by an MDL study in an aqueous matrix. Sample preparation and inter-instrument variability are justifications for not meeting the required PQL of 20 µg/kg.

e. *Method 8090 for 2,4-Dinitrotoluene and 2,6-Dinitrotoluene - requested PQL revision from 13 to 330 µg/kg for 2,4-dinitrotoluene and from 7 to 330 µg/kg for 2,6-dinitrotoluene. Additional information to support the PQL revision request for this specific method must be submitted.*

The detection limit for 2,4-Dinitrotoluene and 2,6-Dinitrotoluene is 82 µg/kg for Method 8090 using a flame ionization detector. If an electron capture detector is used, the detection limit for 2,4-Dinitrotoluene is 0.56 µg/kg and for 2,6-Dinitrotoluene is 0.65 µg/kg.

f. *Method 7470 is not one of the approved methods for Mercury, as it does not provide the lowest PQL and has been recently updated. Either Method 7470A or 7471A shall be used for the analysis of mercury.*

Method 7471A will be used for Mercury. The detection limit is 0.03 µg/L.

g. *Method 8070 for N-nitrosodimethylamine - requested PQL revision from 1.5 to 330 µg/kg. As the requested PQL is 220 times the Method 8070 specified PQL, additional information for this specific test method and the cause for the increase in PQL must be submitted.*

The detection limit for N-Nitrosodimethylamine by Method 8070 is 12 µg/kg. The reporting limit has been revised from 330 µg/kg to 67 µg/kg. Inter-instrument variability and lab contamination is the justification for not meeting the requested PQL of 1.5 µg/kg.

h. *Method 7741A for Selenium - requested PQL revision from 20 to 250 µg/kg. Additional information shall be submitted to justify this PQL revision.*

As stated in our response to Comment 1, we are proposing to perform the analysis for selenium by Method 6020.

For the above requested PQL revisions, it should also be determined if any of the other methods listed for the specific constituent would provide a lower PQL than the proposed PQL revision. If a lower PQL can be achieved with a different test method, it may be necessary to utilize that method.

3. *A PQL revision for Method 8061 for Di-n-butyl phthalate and Diethyl phthalate was also requested. This revision proposed to increase the PQL from 220 to 500 µg/kg for di-n-butyl phthalate and from 170 to 500 µg/kg for Diethyl phthalate. Although these PQL increases can be approved, it should be determined if Method 8060 will provide a lower PQL for the constituents. If a lower PQL can be achieved with Method 8060, then that method shall be utilized.*

   The detection limit for Di-n-butyl phthalate is 28 µg/kg, and the detection limit for Diethyl phthalate is 31 µg/kg; the reporting limits have been revised to 330 µg/kg for both analytes. Method 8060 does not provide a lower PQL for these analytes. We propose to perform the analysis for Dimethyl phthalate by Method 8061 rather than Method 8060 as both methods provide the same detection limit and reporting limit for this analyte.

4. *RAAP proposed to increase the Method 8010B PQL for Methyl Chloride. This increase in PQL from .1 to 1 µg/kg can be approved; however, it should be determined if Method 8021A will provide a lower PQL. If a lower PQL can be achieved with Method 8021A, then that method shall be used.*

   The detection limit for methyl chloride Method 8010B is 0.85 µg/kg. The DL for methyl chloride by Method 8021A is 0.94 µg/kg. As stated in our response to Comment 2c, since both Methods 8010B and 8021A provide comparable MDLs and reporting limits, we propose to perform the analysis for Methyl Chloride by Method 8021A.

5. *For PCB analysis using Method 8250, RAAP proposed to increase the PQL increase from 2000 to 3500 µg/kg. This requested PQL revision can be approved; however, it should be determined if Method 8080A will provide a lower PQL. If a lower PQL can be achieved with Method 8080A, then that method shall be used.*

   We will use Method 8080A for the PCBs analysis as this method provides a lower detection limit than does Method 8250. See Table 1.

If you have any questions or would like additional information, please call Steve Falatko at 703/713-6408, or Bob Hearn at 703/713-6410.

Sincerely,

Willie R. Hearn for

Torsten Rothman, P.E., DEE
Project Manager

MLM/059
0510-01.mlm

Table 1

Analytical Limits for the RAAP Bioplant Equalization Basin Closure

Analyte	Required PQL (µg/kg)	Detection Limit (µg/kg)	Reporting Limit (µg/kg)
VOLATILES			
METHOD 8021A			
Benzene	0.09	0.37	5
Carbon Tetrachloride	0.03	0.94	5
Chlorobenzene	0.01	0.38	5
Chloroform	0.02	1.1	5
trans-1,2-Dichloroethene	0.02	0.93	5
Hexachlorobutadiene	0.20	1.8	5
Methyl Bromide	0.30	1.7	5
Methyl Chloride	0.10	0.94	5
Methylene Chloride	0.20	1.4	5
Naphthalene	0.60	3.4	5
Tetrachloroethene	0.01	0.21	5
Toluene	0.10	0.34	5
1,2,4-Trichlorobenzene	0.20	1.5	5
1,1,1-Trichloroethane	0.01	1.3	5
1,1,2-Trichloroethane	0.07	0.59	5
Trichloroethene	0.01	0.52	5
Trichlorofluoromethane	0.30	0.50	5
Vinyl Chloride	0.06	0.94	5
METHOD 8030A			
Acrolein	7	25	100
METHOD 8240B			
Carbon Disulfide	100	0.98	20
Methyl Ethyl Ketone	100	6.1	100

Table 1 (Continued)

Analytical Limits for the RAAP Bioplant Equalization Basin Closure

Analyte	Required PQL (µg/kg)	Detection Limit (µg/kg)	Reporting Limit (µg/kg)
SEMIVOLATILES			
METHOD 8040A			
4-Chloro-3-methyl phenol	240	41	330
2-Chlorophenol	210	50	330
2,4-Dimethylphenol	210	140	330
Phenol	94	68	330
METHOD 8060			
Dimethyl phthalate	190	29	330
METHOD 8061			
Bis(2-ethylhexyl) phthalate	180	29	330
Butyl benzyl phthalate	28	32	330
Di-n-butyl phthalate	220	28	330
Diethyl phthalate	170	31	330
Di-n-octyl phthalate	33	31	330
METHOD 8070			
N-Nitrosodimethylamine	1.5	12	67
METHOD 8090			
2,4-Dinitrotoluene (FID/ECD)	13	82/0.56	330/10
2,6-Dinitrotoluene (FID/ECD)	7	82/0.65	330/10
METHOD 8110			
Bis(2-chloroethoxy) methane	5	16	30
Bis(2-chloroethyl) ether	3	9.9	30
Bis(2-chloroisopropyl) ether	8	24	30
METHOD 8121			
Hexachlorobenzene	3.8	0.12	3.3
Hexachlorocyclopentadiene	160	0.82	3.3
Hexachloroethane	1.1	0.11	3.3
METHOD 8151			
Pentachlorophenol	1.6	4.3	17

Table 1 (Continued)

Analytical Limits for the RAAP Bioplant Equalization Basin Closure

Analyte	Required PQL (µg/kg)	Detection Limit (µg/kg)	Reporting Limit (µg/kg)
METHOD 8270B			
4,6-Dinitro-2-methylphenol	3,300	27	350
2,4,5-Trichlorophenol	600	34	350
2,4,6-Trichlorophenol	390	33	330
METHOD 8310			
Fluoranthene	140	0.27	10
Fluorene	140	1.0	10
METHOD 8330			
Nitrobenzene	260	12	250
PESTICIDES/PCBs			
METHOD 8080A			
Aldrin	3	0.58	1.7
Chlordane	9.4	3.5	17
Dieldrin	1.3	0.35	3.3
Endosulfan I	9.4	0.43	1.7
Endosulfan II	3	2.8	3.3
Endrin	4	0.30	3.3
Heptachlor	2	0.80	1.7
Heptachlor Epoxide	21	0.47	1.7
Methoxychlor	120	3.6	17
PCB 1016	2,500	4.6	33
PCB 1221	2,500	8.8	67
PCB 1232	2,500	13	33
PCB 1242	2,500	15	33
PCB 1248	2,500	5.0	33
PCB 1254	2,500	5.2	33
PCB 1260	2,500	13	33
METHOD 8081			
Toxaphene	57	34	170

Table 1 (Continued)

Analytical Limits for the RAAP Bioplant Equalization Basin Closure

Analyte	Required PQL (µg/kg)	Detection Limit (µg/kg)	Reporting Limit (µg/kg)
METALS			
METHOD 6020			
Arsenic	10	0.85 µg/L[a]	200
Barium	20	0.16 µg/L[a]	100
Beryllium	3	0.15 µg/L[a]	100
Cadmium	1	0.17 µg/L[a]	200
Chromium	10	0.34 µg/L[a]	100
Lead	10	0.36 µg/L[a]	100
Nickel	0.2	0.67 µg/L[a]	100
Silver	2	0.52 µg/L[a]	100
Thallium	10	0.08 µg/L[a]	100
METHOD 7471A			
Mercury	2	0.03 µg/L[a]	100
METHOD 7740			
Selenium	20	0.51 µg/L[a]	200
METHOD 9010A			
Cyanide	20	8 µg/L[a]	100

[a]These detection limits are based on a MDL study of an aqueous matrix.

Commonwealth of Virginia
Department of Environmental Quality
P&E, DIVISION OF WASTE OPERATIONS
Office of Permitting Management
Facsimile Transmittal

Date:	April 29, 1996	Page 1 of 2

TO:	Jerry Redder
TITLE:	
ORGANIZATION:	Alliant Techsystems
FAX NUMBER:	(540) 639-7214
FROM:	Debra A. Miller
TITLE:	Environmental Engineer Senior
PHONE:	(804) 698-4206 FAX: (804) 698-4234
SUBJECT:	Info Request on SW-846, Method 6020

Please deliver!

Jerry,
As promised, I talked to our Chemists and they provided me with the attached list of labs doing 6020. Please note, this is not all the labs that can perform this analysis, it is just a short list of ones that we had contacted. No recommendation intended. Hope it helps!!

-Debbie

Department of Environmental Quality, P.O. Box 10009, Richmond, Virginia 23240-0009

LABS OFFERING METALS ANALYSIS
BY SW-846 METHOD 6020

NAME	PHONE	CONTACT
Gascoyne	800-GAS-COYN	lab manager
Quanterra	Denver, W. Sacramento	
EMI	540-396-3661	Mark Brooks
Environmental Health Labs.	219-233-4777	Paul Bowers
Synergic Atlantics, Inc	616-538-8700	Sam Yazadani
Aquatech	800-783-5991	
Montgomery Watson Labs	818-568-6486	Rick Zimmer
American Water Works Belleville, Il	XXX- 35-3600	Rick Bessee

NOTE: *This list should not be construed as a recommendation, endorsement, or solicitation for, or on behalf of, any companies listed. It is merely intended to demonstrate that this method is available for use. These are not all the labs using the method, only those we contacted.*

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

Peter W. Schmidt
Director

APR 23 1996

P. O. Box 10009
Richmond, Virginia 23240-00
(804) 762-4000

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

C.A. Jake
Alliant Techsystems Inc.
Environmental Manager
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, VA 24141-0100

RE: Radford Army Ammunition Plant (RAAP), EPA ID# VA12100207306
Equalization Basin Closure Amendment
SW-846 Methods' PQL Revisions

Dear Mr. Jake:

Your letter requesting an amendment to the Equalization Basin's approved closure plan was received by the Department of Environmental Quality (DEQ) on March 27, 1996. This amendment requested a revision of the practical quantitation limits (PQL) for the approved SW-846 test methods and an extension to the closure schedule. The extension request was approved by a letter sent to you on April 17, 1996.

Based on the information submitted regarding revision of the SW-846 Test Methods' PQLs, the following comments must be addressed: (Note, all Test Methods listed are SW-846, Third Addition, as updated)

1. Method 6020 should be the test method used for determination of arsenic, barium, beryllium, chromium, lead, silver, and thallium concentrations. The approved

closure plan requires the use of the SW-846 test method with the lowest PQL for background closure. For these constituents, other test methods with higher PQLs were chosen and a request for revising these PQLs was submitted. Please note, the chosen test methods are not acceptable for background closure. Method 6020 shall be utilized for these constituents as it has the lowest PQL.

2. The revised PQLs for the following constituents cannot be approved at this time. In accordance with SW-846, Chapter One, laboratories shall have procedures for demonstrating proficiency with each analytical method routinely used in the laboratory. These procedures shall include demonstration of precision and bias of the method, as performed in the laboratory, and shall provide for determination of the method detection limit (MDL). Please provide the latest MDLs for each of the below mentioned Methods. Prior to any decision regarding the increase in PQLs, additional justifying information for each of the following SW-846 test methods will also need to be submitted (i.e. sample preparation, reagents, spike recovery, matrix interference, etc...).

a. Method 6020 for Nickel - requested PQL revision from .2 μg/kg to 2500 μg/kg. Please explain the need for an increase of 12500 times. Although acid digestion is needed prior to use of Method 6020 and may contribute to an increase in the achievable PQL, such a large increase, as the one requested, will necessitate the submittal of additional information for appropriate justification.

b. Method 8061 for Butyl benzyl phthalate and Di-n-octyl phthalate - requested PQL revision from 28 to 500 μg/kg for Butyl benzyl phthalate and from 33 to 500 μg/kg for Di-n-octyl phthalate. Both of these revised PQLs are greater than 15 times the recommended SW-846 Method 8061 PQL. Please provide specific justification to explain the increase in PQL for this test method.

c. Method 8010B for Carbon Tetrachloride, Chlorobenzene, Chloroform, Trans-1,2-Dichloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, Trichloroethylene, Tetrachloroethylene, and Vinyl chloride - requested PQL revision from .01-.06 μg/kg (depending on constituent) to 1 μg/kg. This requested PQL modification is from 16 to 100 times greater than the Method 8010B specified PQL. Please explain with greater detail this increase. Note, if the laboratories cannot achieve the Method 8010B PQL, determine if a lower PQL can be achieved for Method 8021A. If a lower PQL for Method 8021A can be achieved, then that method shall be utilized for those constituents.

d. Method 9010A for Cyanide - requested PQL revision from 20 µg/kg to 500 µg/kg. Additional information pertinent to this method shall be provided for justification.

e. Method 8090 for 2,4-Dinitrotoluene and 2,6-Dinitrotoluene - requested PQL revision from 13 to 330 µg/kg for 2,4-dinitrotoluene and from 7 to 330 µg/kg for 2,6-dinitrotoluene. Additional information to support the PQL revision request for this specific method must be submitted.

f. Method 7470 is not one of the approved methods for Mercury, as it does not provide the lowest PQL and has been recently updated. Either Method 7470A or 7471A shall be used for the analysis of mercury.

g. Method 8070 for N-nitrosodimethylamine - requested PQL revision from 1.5 to 330 µg/kg. As the requested PQL is 220 times the Method 8070 specified PQL, additional information for this specific test method and the cause for the increase in PQL must be submitted.

h. Method 7741A for Selenium - requested PQL revision from 20 to 250 µg/kg. Additional information shall be submitted to justify this PQL increase.

For the above requested PQL revisions, it should also be determined if any of the other methods listed for the specific constituent would provide a lower PQL than the proposed PQL revision. If a lower PQL can be achieved with a different test method, it may be necessary to utilize that method.

3. A PQL revision for Method 8061 for Di-n-butyl phthalate and Diethyl phthalate was also requested. This revision proposed to increase the PQL from 220 to 500 µg/kg for di-n-butyl phthalate and from 170 to 500 µg/kg for Diethyl phthalate. Although these PQL increases can be approved, it should be determined if Method 8060 will provide a lower PQL for the constituents. If a lower PQL can be achieved with Method 8060, then that method shall be utilized.

4. RAAP proposed to increase the Method 8010B PQL for Methyl Chloride. This increase in PQL from .1 to 1 µg/kg can be approved; however, it should be determined if Method 8021A will provide a lower PQL. If a lower PQL can be achieved with Method 8021A, then that method shall be used.

5. For PCB analysis using Method 8250, RAAP proposed to increase the PQL

increase from 2000 to 3500 µg/kg. This requested PQL revision can be approved; however, it should be determined if Method 8080A will provide a lower PQL. If a lower PQL can be achieved with Method 8080A, then that method shall be used.

Based on review of the information submitted, this closure plan amendment will require the submittal of additional information. RAAP is requested to submit an updated closure plan amendment addressing these comments within 30 days of receipt of this letter. If there are any questions regarding the information provided, please contact me at (804) 698-4206.

Sincerely,

Debra A. Miller

Debra A. Miller
Environmental Engineer Senior

Enclosures
cc: Lisa Ellis, DEQ
Aziz Farahmand, DEQ-RRO
Mike Scott, DEQ-RRO

96-056 Reader/ Barker/ Jake ACO

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

APR 17 1996

Peter W. Schmidt
Director

P. O. Box 10009
Richmond, Virginia 23240-00
(804) 762-4000

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

C.A. Jake
Environmental Manager
Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, VA 24141-0100

RE: RAAP Equalization Basin Closure Amendment
Extension to Closure Schedule
EPA ID# VA12100207306

Dear Mr. Jake:

Your letter requesting an amendment to the Equalization Basin's approved closure plan was received by the Department of Environmental Quality (DEQ) on March 27, 1996. This amendment requested a revision of the PQLs for the approved SW-846 test methods, and an extension to the closure schedule. The modification of the PQLs are under review and will be addressed in a separate correspondence.

The closure activities will, of necessity, take longer to complete than the approved closure schedule in order to accommodate the Corp of Engineer's requirements for the project. Based on the information submitted, DEQ will approve this modified schedule for completion of closure activities at the RAAP's Equalization Basin. Closure activities shall be completed and reports submitted in accordance with the revised closure schedule. This revised closure schedule is attached, please update your closure plan as necessary. During this extension period, RAAP shall continue to take all steps to prevent threats to human health and the environment from the Equalization Basin that is no longer operating but has not undergone formal closure.

If there are any additional questions, please contact Debra Miller, Environmental Engineer Senior, of my staff at (804) 698-4206.

Sincerely,

Leslie A Romanchik

for Peter W. Schmidt
Director

Attachment
cc: Leslie Romanchik, DEQ
Lisa Ellis, DEQ
Debra Miller, DEQ
Claire Slaughter, DEQ

TABLE 3-4 CLOSURE SCHEDULE DURING CLEAN CLOSURE ATTEMPT	
Activity	Date
Closure Plan Approved	1/2/96
Sample Background/ Calculate Background Critical Value/ Take Soil Samples in Subsoil Assessment	March & April 1996
Submit Analystical Results to VDEQ for approval of background (DEQ response 7 days) and Subsoil Assessment	5/14/96
Finalize Plans and Specifications	5/28/96
Advertize for Bids	May & June 1996
Open Bids	7/8/96
Begin Construction	9/9/96
Remove contaminated soil/ resample/ or contingent close Receive Additional Lab Analyses/ Statistical Analysis and Submit to VDEQ Submit Monthly QA/QC Reports as Work Continues Remove contaminated soil/ resample/ or contingent close Repeat Sampling and Excavation as Necessary to "Clean" Close or submit a letter to VDEQ and go to Contingent Closure Plan	September 1997 through February 1997
Equipment Decontamination	March 1997
Receive Lab Analyses of Pre- and Post- Rinses	3/15/97
Submit Final Report of QA/QC on Work Performed	5/12/97

ALLIANT TECHSYSTEMS

Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, VA 24141-0100

March 22, 1996

96-815-097

Clifton L. Parker IV
Department of Environmental Quality
Office of Permitting Management, Hazardous Waste
629 East Main Street, Suite 406
Richmond, VA 23219

Subject: Closure Plan for Equalization Basin HWMU 10 & SWMU 10
Radford Army Ammunition Plant, Radford Virginia, EPA ID# VA12100207306

Dear Mr. Parker:

The Corps of Engineer's laboratory contractor surveyed at least 5 laboratories to attempt to meet the PQL's required in Paragraph 3.5 of the closure plan. Mr. Redder sent the information to two other laboratories. Enclosure A is a chart showing the best PQL's that are achievable using the methods in the plan. The method listed in the plan will be used, but due to intra- laboratory instrument variability, laboratory contamination (e.g., acetone in the atmosphere), the soil matrix, and the fact that the PQL listed in SW-846 methods are presented for guidance only, we request that the PQL's shaded in the last column be acceptable for background and for the intent of this closure plan.

In addition we are requesting a modification to paragraph 3.15 Closure Schedule Table 3.4 as shown in Enclosure B. The modification extends the schedule of completion to approximately 15 months from date of approval to accommodate the Corps of Engineer's requirements to complete the project. Your understanding in this matter is appreciated.

If you have any questions or concerns please contact Jerry Redder (540) 639 7536
Sincerely

C. A. Jake

C. A. Jake
Environmental Manager

Enclosures

w/ enclosures
c: West Central Regional Office- Roanoke
R. L. Richardson, RAAP ACO
S. M. Lantz, Norfolk Corps of Engineers

Coordination: J. E. Woolwine

R. L. Richardson

w/o Enclosures

bc: Adm. File
D. W. Ratcliff
C. A. Jake
J. J. Redder
Env. File

ENCLOSURE A

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL µG/L (WATER)	PQL µG/Kg (SOIL)	Proposed PQL µG/Kg (SOIL)
1	Acrolein;	8030A	7	7	15
	2-Propenal	8240A	(5)	-	-
		8316	300	-	-
2	Aldrin	8080A	0.04	3	3
		8081	0.34	22	22
		8250A	19	1,300	1,300
		8270B	(10)	-	-
3	Arsenic	6010A	530	530	530
		6020	0.2	0.2	0.2
		7060A	10	10	250
		7061A	20	20	20
		7062	10	10	10
4	Barium	6010A	20	20	2,500
		6020	0.2	0.2	0.2
		7080A	1,000	1,000	1,000
		7081	-	-	-
5	Benzene	8020A	2	2	2
		8021A	0.09	0.09	1
		8240B	5	5	5
		8260	1	5	5
6	Beryllium	6010A	3	3	100
		6020	0.2	0.2	0.2
		7090	50	50	50
		7091	2	2	2
7	Bis(2-chloroethoxy)methane;	8010B	-	-	-
	Bis(2-chloromethoxy)ethane;	8110	5	5	30
	Ethane, 1,1'-[methylenebis(oxy)]bis[2chloro	8250A	53	3,600	3,600
		8270B	10	660	660
		8410	-	-	-
8	Bis(2-chloroethyl)ether	8110	3	3	30
		8250A	57	3,800	3,800
		8270B	10	660	660
		8410	-	-	-
9	Bis(2-chloro-1-methylethyl)ether;	8010B	-	-	-
	2,2'dichlorodiisopropyl ether;	8110	8	8	30
	Bis(2-chloroisopropyl) ether	8250A	57	3,800	3,800
		8270B	10	660	660
		8410	-	-	-

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL µG/L (WATER)	PQL µG/Kg (SOIL)	Proposed PQL µG/Kg (SOIL)
10	Bis(2-ethylhexyl)phthalate	8060	20	1,000	1,000
		8061	2.7	180	500
		8250A	25	1,700	1,700
		8270B	-	-	-
11	Butyl benzyl phthalate; Benzyl butyl phthalate	8060	3.4	230	230
		8061	0.42	28	500
		8250A	25	1,700	1,700
		8270B	10	660	660
		8410	-	-	-
12	Cadmium	6010A	40	40	40
		6020	0.2	0.2	0.2
		7130	50	50	50
		7131A	1	1	25
13	Carbon disulfide	8240B	100	100	100
14	Carbon tetrachloride	8010B	0.03	0.03	1
		8021A	0.1	0.1	0.1
		8240B	5	5	5
		8260	1	5	5
15	Chlordane	8080A	0.14	9.4	9.4
		8081	0.37	15	15
		8250A	(10)	(200)	(200)
		8270B	-	-	-
16	Chlorobenzene	8010B	0.01	0.01	1
		8020A	2	2	2
		8021A	0.03	0.03	0.03
		8240B	5	5	5
		8260	1	5	5
17	p-Chloro-m-cresol; 4-Chloro-3-methylphenol	8040A	3.6	240	240
		8270B	20	1,300	1,300
		8410	-	-	-
18	Chloroform; Trichloromethane	8010B	0.02	0.02	1
		8021A	0.2	0.2	0.2
		8240B	5	5	5
		8260	1	5	5
19	2-Chlorophenol	8040A	3.1	210	210
		8250A	33	1,300	1,300
		8270B	10	660	660
		8410	-	-	-

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL µG/L (WATER)	PQL µG/Kg (SOIL)	Proposed PQL µG/Kg (SOIL)
20	Chromium	6010A	70	70	70
		6020	0.2	0.2	0.2
		7090	500	500	500
		7191	10	10	250
21	Cyanide	9010A	20	20	500
		9012	-	-	-
22	trans-1,2-Dichloroethylene	8010B	0.02	0.02	1
		8021A	0.5	0.5	0.5
		8240B	5	5	5
		8260	1	5	5
23	Di-n-butyl phthalate	8060	3.6	240	240
		8061	3.3	220	500
		8250A	25	1,800	1,800
		8270B	10	-	-
		8410	-	-	-
24	Dieldrin	8080A	0.02	1.3	1.3
		8081	0.44	-	-
		8250A	25	1,700	1,700
		8270B	(10)	-	-
25	Diethyl phthalate	8060	4.9	330	330
		8061	2.5	170	500
		8250A	19	1,300	1,300
		8270B	10	660	660
26	2,4-Dimethylphenol	8040A	3.2	210	210
		8250A	27	1,800	1,800
		8270B	10	660	660
27	Dimethyl phthalate	8060	2.9	190	500
		8061	6.4	430	430
		8250A	16	1,100	1,100
		8270B	10	660	660
		8410	-	-	-
28	4,6-Dinitro-o-cresol; 4,6-Dinitro-2-methylphenol	8040A	160	11,000	11,000
		8270B	50	3,300	3,300
		8410	-	-	-
29	2,4-Dinitrotoluene	8090	0.2	13	330
		8250A	57	3,800	3,800
		8270B	10	660	660
		8330	0.02	250	250
		8410	-	-	-

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL µG/L (WATER)	PQL µG/Kg (SOIL)	Proposed PQL µG/Kg (SOIL)
30	2,6-Dinitrotoluene	8090	0.1	7	330
		8250A	19	1,300	1,300
		8270B	10	660	660
		8330	0.31	260	260
		8410	-	-	-
31	Di-n-octyl phthalate	8060	30	2000	2000
		8061	0.49	33	500
		8250A	25	1,700	1,700
		8270B	10	660	660
		8410	-	-	-
32	Endosulfan I	8080A	0.14	9.4	9.4
		8081	0.3	21	21
		8250A	(10)	(200)	(200)
		8270B	-	-	-
33	Endosulfan II	8080A	0.04	3	3.3
		8081	0.4	24	24
		8250A	-	-	-
		8270B	-	-	-
34	Endrin	8080A	0.06	4	4
		8081	0.39	36	36
		8250A	(10)	(200)	(200)
35	Fluoranthene	8100	(200)	(200)	(200)
		8250A	22	1,500	1,500
		8270B	10	660	660
		8310	2.1	140	140
		8410	-	-	-
36	Fluorene	8100	(200)	(200)	(200)
		8250A	19	1,300	1,300
		8270B	10	660	660
		8310	2.1	140	140
		8410	-	-	-
37	Heptachlor	8080A	0.03	2	2
		8081	0.4	20	20
		8250A	19	1,300	1,300
		8270B	(10)	-	-
38	Heptachlor epoxide	8080A	0.83	56	56
		8081	0.32	21	21
		8250A	22	1,500	1,500
		8270B	(10)	-	-

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL µG/L (WATER)	PQL µG/Kg (SOIL)	Proposed PQL µG/Kg (SOIL)
39	Hexachlorobenzene	8081	-	-	-
		8120A	0.5	30	30
		8121	$5.6x10^{-2}$	**3.8**	**3.8**
		8250A	19	1,300	1,300
		8270B	10	660	660
		8410	-	-	-
40	Hexachlorobutadiene	8021A	0.2	**0.2**	**1**
		8120A	3.4	230	230
		8121	$1.4X10^{-2}$	0.94	0.94
		8250A	9	600	600
		8260	1	5	5
		8270A	10	660	660
		8410	-	-	-
41	Hexachlorocyclopentadiene	8081	-	-	-
		8120A	4	300	300
		8121	2.4	**160**	**160**
		8250A	-	-	-
		8270B	10	660	660
		8410	-	-	-
42	Hexachloroethane	8120A	0.3	20	20
		8121	$1.6x10^{-2}$	**1.1**	**3.3**
		8250A	16	1,100	1,100
		8270B	10	660	660
		8410	-	-	-
43	Lead	6010A	420	420	420
		6020	0.2	0.2	0.2
		7420	1,000	1,000	1,000
		7421	10	**10**	**250**
44	Mercury	7470			**100**
		7470A	2	**2**	**2**
		7471A	2	**2**	**2**
45	Methoxychlor	8080A	1.8	**120**	**120**
		8081	-	-	-
		8250A	-	-	-
		8270B	10	-	-
46	Methyl bromide; Bromomethane	8010B	0.3	**0.3**	**1**
		8021A	11	11	11
		8240B	10	10	10
		8260	1	5	5

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL µG/L (WATER)	PQL µG/Kg (SOIL)	Proposed PQL µG/Kg (SOIL)
47	Methyl chloride; Chloromethane	8010B 8021A 8240B 8260	0.1 0.3 10 1	0.1 0.3 10 5	1 0.3 10 5
48	Methylene chloride; Dichloromethane	8010B 8021A 8240B 8260	-0.1 0.2 5 1	0.1- 0.2 5 5	1- 1 5 5
49	Methyl Ethyl Ketone; 2-Butanone; MEK	8015A 8240B	- 100	- 100	- 100
50	Naphthalene	8021A 8100 8250A 8260 8270B 8410	0.6 (200) 16 1 10 -	0.6 (200) 1,100 5 660 -	1 (200) 1,100 5 660 -
51	Nickel	6010A 6020 7520	150 0.2 400	150 0.2 400	150 2,500 400
52	Nitrobenzene	8090 8250A 8270B 8330 8410	36 19 10 6.4 -	2400 2,400 660 260 -	2400 2,400 660 260 -
53	N-Nitrosodimethylamine	8070 8250A 8270B 8410	1.5 - (10) -	1.5 - - -	330 - - -
54	Pentachlorophenol	8040A 8151 8250A 8270B 8410	5.9 0.76 36 50 -	400 1.6 2,400 3,300 -	400 17 2,400 3,300 -
55	Phenol	8040A 8250A 8270B 8410	1.4 15 10 -	94 1,000 660 -	100 1,000 660 -

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL µG/L (WATER)	PQL µG/Kg (SOIL)	Proposed PQL µG/Kg (SOIL)
64	1,1,1-Trichloroethane;	8010B	0.01	0.01	1
	Methyl chloroform	8021A	0.3	0.3	0.3
		8240B	5	5	5
		8260	1	5	5
65	1,1,2-Trichloroethane	8010B	0.07	0.07	1
		8021A	-	-	-
		8240B	5	5	5
		8260	1	5	5
66	Trichloroethylene;	8010B	0.01	0.01	1
	Trichloroethene	8021A	0.1	0.1	0.1
		8240B	5	5	5
		8260	1	5	5
67	Trichlorofluoromethane	8010B	(10)	(10)	(10)
		8021A	0.3	0.3	1
		8240B	(5)	-	-
		8260	1	5	5
68	2,4,5-Trichlorophenol	8250A	-	-	-
		8270B	10	660	660
		8410	-	-	-
69	2,4,6-Trichlorophenol	8040A	5.8	390	390
		8250A	27	1,800	1,800
		8270B	10	660	660
		8410	-	-	-
70	Vinyl chloride	8010B	0.06	0.06	1
		8021A	0.2	0.2	0.2
		8240B	10	10	10
		8260	1	5	5

ENCLOSURE B

TABLE 3-4 CLOSURE SCHEDULE DURING CLEAN CLOSURE ATTEMPT	
Activity	Date
Closure Plan Approved	1/2/96
Sample Background/ Calculate Background Critical Value/ Take Soil Samples in Subsoil Assessment	March & April 1996
Submit Analystical Results to VDEQ for approval of background (DEQ response 7 days) and Subsoil Assessment	5/14/96
Finalize Plans and Specifications	5/28/96
Advertize for Bids	May & June 1996
Open Bids	7/8/96
Begin Construction	9/9/96
Remove contaminated soil/ resample/ or contingent close Receive Additional Lab Analyses/ Statistical Analysis and Submit to VDEQ Submit Monthly QA/QC Reports as Work Continues Remove contaminated soil/ resample/ or contingent close Repeat Sampling and Excavation as Necessary to "Clean" Close or submit a letter to VDEQ and go to Contingent Closure Plan	September 1997 through February 1997
Equipment Decontamination	March 1997
Receive Lab Analyses of Pre- and Post- Rinses	3/15/97
Submit Final Report of QA/QC on Work Performed	5/12/97

ALLIANTTECHSYSTEMS

Fax Cover Sheet

Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

Date: Dec. 4, 1995	Time: 12:45	Pages to follow: 7	___ Urgent ___ Confidential
To: Clifton Parker		Company: DEQ Office of permitting Management	
Address: DEQ Richmond, VA			
Telephone: 804-698-4142		Fax: 804-698-4234	
From: J. J. Redder		Telephone: (540) 639-7536	Fax: (540) 639-4361
Note: If you did not receive a clear transmission, please call: Jerry Redder			Telephone: 540-639-7536

Comments:
Enclosed is the charts on the HCOC. I tried moving them as you requested and made a mess. The legend dealshow I marked up the list.

Legend
RAAP suggested HCOC
* Below detection in operational sample but used on plant
** Below detection in operational sample and not used on plant
Items not marked were analyzed for the first time in Sept. 1995 and are either below the current PQL r were essentially not detected.
mg/l milligrams per liter
Ug/l micrograms per liter

	CONSTITUENT	1	2	3	4	VI Aug, 90 mg/l (Total)	89 Samples mg/l	PART B, June 90 mg/l	Sep 95 Ug/l
1	Acrolein	X							
2	Acrylonitrile				X				<6.38
3	Aldrin	X							
4	Antimony			X					4.120
5	Arsenic		X			<3.48>, TCLP 4UGL		0.002 mg/l	
6	Barium	X				175, TCLP 494UGL		0.9 mg/l	
7	Benzene	X					<.003		
8	Benzo[a]anthracene			X					2.47
9	Benzo[b]fluoranthene				X				1.81
10	Benzo[k]fluoranthene				X				0.971
11	Benzo[a]pyrene				X				1.76
12	Beryllium			X					359

	CONSTITUENT	1	2	3	4	VI Aug, 90 mg/l (Total)	89 Samples mg/l	PART B, June 90 mg/l	Sep 95 Ug/l
13	Bis(2-chloroethox)methane; Bis(2-chloromethoxyl)ethane				X				<786
14	Bis(2-chloroethyl)ether				X				<1,230
15	Bis(2-chloroisopropyl)ether				X				<1,170
16	Bis(2-ethylhexyl)phthalate				X				46,000
17	Bromoform			X					<1.83
18	Butyl benzyl phthalate			X					<679
19	Cadmium		X			TCLP <4UGL	5.1	<0.005mg/l	
20	Carbon disulfide		X						
21	Carbon tetrachloride**			X				<.003	<2.49
22	Chlordane**			X				<.005	<1,480
23	Chlorobenzene**			X				<.003	<2.27
24	4-Chloro-3-methylphenol				X				<1,930
25	Chloroform Trichloromethane**				X			<.007	<3.07
26	2-Chlorophenol				X				<908
27	Chromium		X			85.7, TCLP 6.02UGL	160	<.05	

	CONSTITUENT	1	2	3	4	VI Aug, 90 mg/l (Total)	89 Samples mg/l	PART B, June 90 mg/l	Sep 95 Ug/l
28	Chrysene				X				1.52
29	Dibenzo(a,h)anthracene				X				0.523
30	Di-n-butyl phthalate	X				491			
31	1,2-dicholorobenzene				X				<1.33
32	1,3-Dicholorobenzene				X				<1.72
33	1,4-Dicholorobenzene**			X				<.003	<2.28
34	3,3-Dichlorobenzidine				X				<1,950
35	2,4-Dichlorophenol				X				<1,080
36	1,2-Dichloropropane			X					<1.78
37	Dieldrin			X					1,420
38	Diethyl phthalate	X							
39	2,4-Dimethylphenol			X					2,390
40	Dimethyl phthalate	X							
41	4,6-Dinitro-2-methylphenol				X				
42	2,4-Dinitrophenol				X				
43	2,4-Dinitrotoluene	X				<327>		<.010	
44	2,6-Dinitrotoluene		X			<94>			
45	Di-n-octyl phthalate	X							
46	Endosulfan I				X				

	CONSTITUENT	1	2	3	4	VI Aug, 90 mg/l (Total)	89 Samples mg/l	PART B, June 90 mg/l	Sep 95 Ug/l
47	Endosulfan II				X				
48	Endrin**			X				<.002	<1,970
49	Fluoranthene		X			4			
50	Fluorene			X					7.22
51	Heptachlor			X				<.0005	<456
52	Heptachlor epoxide			X					291,000
53	Hexachlorobenzene**			X				<.010	<2,310
54	Hexachlorobutadiene			X					<1,770
55	Hexachlorocyclopentadiene*				X			0.7	<9,470
56	Hexachloroethane			X				<.002	<2,480
57	Indeno(1,2,3-cd)pyrene			X				<.001	0.633
58	Lead	X				>50,000, TCLP 8400UGL	8100		
59	Mercury		X			0.69	0.75		
60	Methoxychlor			X					<6,880
61	Bromomethane			X					
62	Chloromethane			X					
63	Methylene Chloride			X					3.03

	CONSTITUENT	1	2	3	4	VI Aug, 90 mg/l (Total)	89 Samples mg/l	PART B, June 90 mg/l	Sep 95 Ug/l
64	Methyl Ethyl Ketone; 2-Butanone; MEK*	X						<.1	
65	Naphthalene				X				<1,580
66	Nickel		X			<12.6, TCLP 160UGL	61		
67	Nitrobenzene*	X						<0.1	
68	N-Nitrosodimethylamine				X	<602>			<2,820
69	Pentachlorophenol	X						<.050	
70	Phenol	X							
71	Polychlorinated biphenyls; PCBs	X							
72	Selenium		X					<.001	
73	Silver	X				44, TCLP <4.6UGL		<.025	
74	Tetrachloroethylene; Tetrachloroethene*; Perchloroethylene; PCE	X						<.003	
75	Thallium			X					467
76	Toluene	X				25			
77	Toxaphene**			X				<.005	<2,840
78	1,2,4-Trichlorobenzene				X				<1,360

	CONSTITUENT	1	2	3	4	VI Aug, 90 mg/l (Total)	89 Samples mg/l	PART B, June 90 mg/l	Sep 95 Ug/l
79	1,1,2-Trichloroethane			X					<240
80	Trichloroethylene*; Trichloroethene	X				<.003			
81	Trichlorofluoromethane			X					<10
82	2,4,5-Trichlorophenol			X		<.010			<1,360
83	2,4,6-Trichlorophenol			X		<.010			<962
84	Vinyl Chloride*	X				<.003			